MCQs, One word, Short and long Questions from Kinetic molecular model of a gas: postulates and derivation of the kinetic gas equation

Content Type	Questions and Answers
Status	Done
Chapter	Gaseous State
Course	Graduation
Reference	
Subject	Physical Chemistry
Topic	Kinetic Theory
Ruhul Amin	@February 4, 2023 2:09 AM
Progress (%)	
Difficulty Level	Medium
Mistake type	
Previous Year Questions	

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Answer in one word
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MCQs : Theoretical

❓ What is the main idea behind the kinetic molecular model of a gas?
A. Gases consist of large particles in random motion
B. Gases consist of small particles in random motion
C. Gases consist of small particles in ordered motion
D. Gases consist of large particles in ordered motion
Answer: B. Gases consist of small particles in random motion

❓ What is the relationship between the pressure of a gas and the average force exerted by its particles on the walls of the container?
A. The pressure of the gas is proportional to the average force exerted by the particles on the walls
B. The pressure of the gas is inversely proportional to the average force exerted by the particles on the walls
C. The pressure of the gas is equal to the average force exerted by the particles on the walls
D. The pressure of the gas is not related to the average force exerted by the particles on the walls
Answer: A. The pressure of the gas is proportional to the average force exerted by the particles on the walls

❓ What is the relationship between the temperature of a gas and the average kinetic energy of its particles?
A. The temperature of the gas is proportional to the average kinetic energy of its particles
B. The temperature of the gas is inversely proportional to the average kinetic energy of its particles
C. The temperature of the gas is equal to the average kinetic energy of its particles
D. The temperature of the gas is not related to the average kinetic energy of its particles
Answer: A. The temperature of the gas is proportional to the average kinetic energy of its particles

❓ What is the ideal gas constant (R) used in the kinetic gas equation?
A. A constant that relates the pressure and volume of a gas
B. A constant that relates the temperature and volume of a gas
C. A constant that relates the pressure, volume, and temperature of a gas
D. A constant that relates the pressure, volume, temperature, and number of particles of a gas
Answer: C. A constant that relates the pressure, volume, and temperature of a gas

❓ What is the kinetic gas equation?
A. An equation that relates the pressure and volume of a gas
B. An equation that relates the temperature and volume of a gas
C. An equation that relates the pressure, volume, and temperature of a gas
D. An equation that relates the pressure, volume, temperature, and number of particles of a gas
Answer: C. An equation that relates the pressure, volume, and temperature of a gas

❓ What is the law of equipartition of energy?
A. The energy in a gas is evenly divided among all of its particles
B. The energy in a gas is divided among its particles in proportion to their mass
C. The energy in a gas is divided among its particles in proportion to their velocity
D. The energy in a gas is divided among its particles in proportion to the number of particles
Answer: A. The energy in a gas is evenly divided among all of its particles

❓ What is the average speed of the particles in a gas related to the temperature of the gas?
A. The average speed of the particles is directly proportional to the temperature of the gas
B. The average speed of the particles is inversely proportional to the temperature of the gas
C. The average speed of the particles is not related to the temperature of the gas
D. The average speed of the particles is proportional to the square root of the temperature of the gas
Answer: D. The average speed of the particles is proportional to the square root of the temperature of the gas

❓ What is the distribution of speeds of particles in a gas described by?
A. The Maxwell-Boltzmann distribution
B. The Boltzmann distribution
C. The Planck distribution
D. The Einstein distribution
Answer: A. The Maxwell-Boltzmann distribution

❓ What does the kinetic gas equation describe?
A. The pressure-volume relationship in a gas
B. The temperature-volume relationship in a gas
C. The pressure-temperature relationship in a gas
D. The pressure-volume-temperature relationship in a gas
Answer: D. The pressure-volume-temperature relationship in a gas

❓ What is the relationship between the pressure and volume of a gas described by the kinetic gas equation?
A. Directly proportional
B. Inversely proportional
C. Exponentially proportional
D. Logarithmically proportional
Answer: B. Inversely proportional

❓ What is the ideal gas law?
A. PV = nRT
B. PV = kRT
C. P = nRT
D. P = kRT
Answer: A. PV = nRT

❓ What is the value of R in the ideal gas law?
A. The universal gas constant
B. The molar gas constant
C. The atmospheric gas constant
D. The ideal gas constant
Answer: A. The universal gas constant

❓ What is the difference between an ideal gas and a real gas?
A. Ideal gases have no intermolecular forces, while real gases have intermolecular forces
B. Ideal gases have perfect elasticity, while real gases have imperfect elasticity
C. Ideal gases have infinite compressibility, while real gases have finite compressibility
D. All of the above
Answer: D. All of the above

❓ What is the postulate of the kinetic molecular model of a gas?
A. Gas particles are in constant random motion
B. Gas particles are perfectly elastic
C. Gas particles have no intermolecular forces
D. Gas particles are of infinite size
Answer: A. Gas particles are in constant random motion

❓ How does the temperature of a gas relate to the average kinetic energy of its particles?
A. The temperature of a gas is directly proportional to the average kinetic energy of its particles
B. The temperature of a gas is inversely proportional to the average kinetic energy of its particles
C. The temperature of a gas is proportional to the square of the average kinetic energy of its particles
D. The temperature of a gas is proportional to the square root of the average kinetic energy of its particles
Answer: A. The temperature of a gas is directly proportional to the average kinetic energy of its particles

MCQs: Numerical

Answer in one word

❓ Q: What is the kinetic gas equation?
A: Pressure-temperature-particles relation.

❓ Q: What are kinetic molecular model postulates?
A: Particles, randomness, thermal equilibrium, volume, elastic collisions.

❓ Q: What is derived from the kinetic molecular model?
A: Kinetic gas equation.

❓ Q: What is significant about the kinetic gas equation?
A: Ideal gas behavior explanation.

❓ Q: What is ideal gas behavior?
A: Pressure-volume-temperature relation.

❓ Q: What is the relationship between pressure, temperature and particles in kinetic gas equation?
A: Proportional.

❓ Q: What is the purpose of kinetic molecular model?
A: Gas behavior explanation.

❓ Q: What is the definition of an ideal gas?
A: Simplified gas model.

Short Answer type Question

❓ Q: What is the kinetic molecular model of a gas?
A: The kinetic molecular model of a gas is a theoretical model that describes the behavior of a gas in terms of the motion and interaction of its constituent particles.

❓ Q: What are the postulates of the kinetic molecular model of a gas?
A: The postulates of the kinetic molecular model of a gas are: (1) Gases consist of a large number of small particles in constant random motion, (2) These particles are in thermal equilibrium with each other, (3) The particles occupy the entire volume of the container, and (4) The collisions between the particles and the walls of the container are perfectly elastic.

❓ Q: What is the kinetic gas equation?
A: The kinetic gas equation is an equation that relates the pressure, temperature, and number of particles in an ideal gas. It states that the pressure of an ideal gas is proportional to the average kinetic energy of its particles.

❓ Q: How is the kinetic gas equation derived from the kinetic molecular model of a gas?
A: The kinetic gas equation is derived from the kinetic molecular model of a gas by considering the collisions between the particles and the walls of the container. The pressure of the gas is proportional to the average force exerted by the particles on the walls, which in turn is proportional to the average kinetic energy of the particles. The temperature of the gas is related to the average kinetic energy of the particles through the Boltzmann distribution law.

❓ Q: What is the significance of the kinetic gas equation?
A: The kinetic gas equation is a fundamental equation in statistical mechanics that provides a theoretical explanation for the behavior of ideal gases. It is used to calculate the pressure, volume, and temperature of a gas under different conditions and to understand the relationships between these properties.